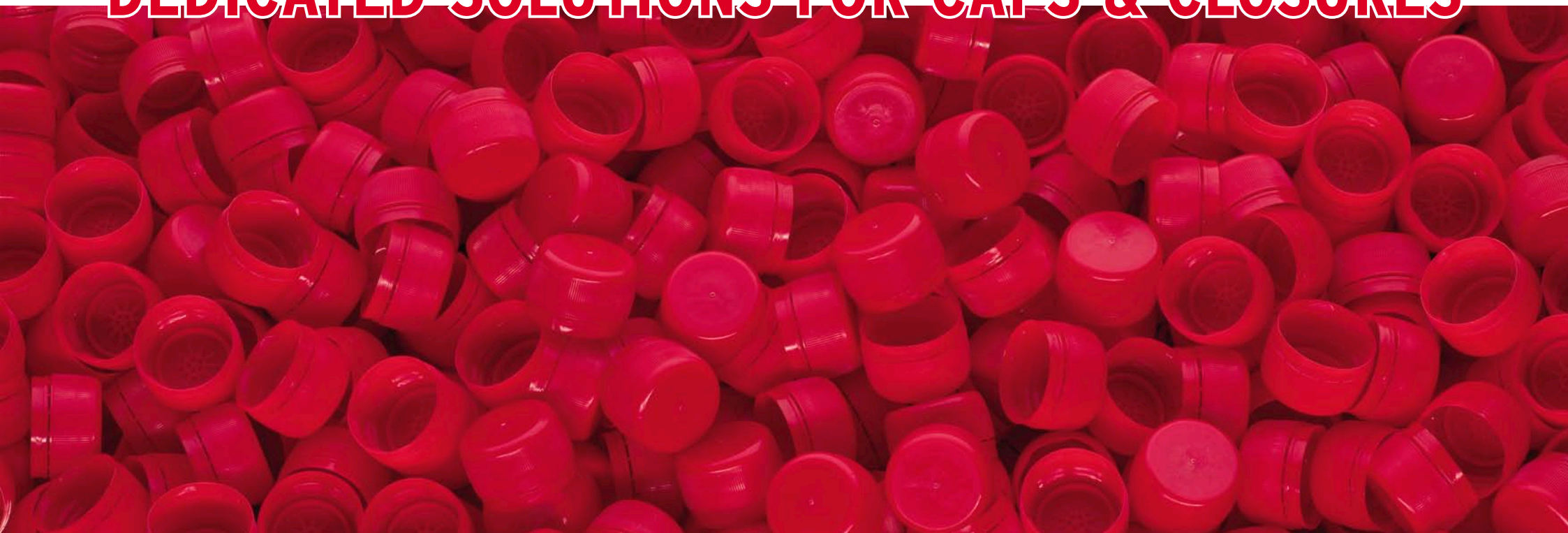


DEDICATED SOLUTIONS FOR CAPS & CLOSURES



CAPS & CLOSURES

Caps and closures represent a significant portion of the world's consumer packaging – and the sector is growing at an average rate of more than 5% per year. Beverage cap production is largely cost-driven and characterized by ongoing efforts to reduce weight and production cycle times. By contrast, other closure designs are becoming more complex, adding new functionality, such as dispensing, clean pouring with silicone valves, or advanced tamper-evidence protection. Ferromatik Milacron offers a full range of dedicated solutions for the whole gamut of caps and closures production – from millions of lightweight 1.5 g parts a day to complex five-piece 20 g closures systems.



FROM SIMPLE CAPS TO COMPLEX DISPENSING SYSTEMS



One-piece beverage caps including tamper-evident rings for PET or glass bottles. Dimensions: 28 mm – 30/25 – 33 mm – 38 mm.



One-piece closure with hinged lid typically used for beverage, home care and personal care products. System includes lid-closing operation prior to ejection.









Value-added multi-component hinged closures for up-scale beverage or personal care products.



Multi-element closure assembled in-mold from two or more injected parts.

- CAP-TEC
- K-TEC
- K-TEC ETW
- K-TEC DETW

Number of Material	1	1	2	2
Number of Parts	1	1	1	2
Type of Caps	Beverage	Hinge Lid, Flip-Top	Hinge Lid, Flip-Top	Dispensing
Applications	Water, CSD	Food, Cosmetic	Food, Cosmetic	Food, Cosmetic
Weight	2 - 4 g	5 - 10 g	5 - 10 g	> 3 g
Materials	HDPE - PP	PP - HDPE	PP - HDPE - TPE	PP - HDPE - TPE

One Face Mold		Cavities Cycle Time	16-24-32-48-64-72-96 2,5 - 5 s	8-16-24-32-48 12 - 16 s	8-16-24-32-48 12 - 17 s	8-16-24-32-48-64-72-96 11 - 18 s *
Stack Mold		Cavities Cycle Time	2 x (16-24-32-48-64) 3,5 - 6 s	2 x (8-16-24-32-48) 12 - 16 s	2 x (8-16-24-32-48) 13 - 18 s	2 x (16-24-32-48-64) 11 - 18 s *
Turntable		Cavities Cycle Time			8-16-24 10 - 15 s	
Turning Stack Mold		Cavities Cycle Time			2 x (8-16-24-32-48) 10 - 15 s	
Cube Mold		Cavities Cycle Time		4 x (16-24-32-48) 6 - 10 s	4 x (16-24-32-48) 8 - 13 s	
Twin Cube Mold		Cavities Cycle Time				2 x [4 x (16-24-32-48)] 8 - 13 s

* Require additional assembly process



THE CAP-TEC SERIES

Dedicated Machine for High-Volume Cap Production

Parts Requirements

- Large multi-cavity caps molds
- 48, 64, 72, and 96-cavity molds
- Special HDPE grade or PP

Production Requirements

- Extremely fast cycle time
- High shot-to-shot repeatability
- Highest up-time
- Best output to production cost ratio

Small Parts in Large Quantities

Despite the diversity of their geometries, beverage caps share certain characteristics. With wall-thicknesses typically not more than 0.7 mm and now often less than 2 g weight for a typical PET bottle, beverage caps require only a short clamping unit stroke. On the injection side a relatively modest plasticizing stroke of 0.5 – 1.5 D is sufficient. On the other hand, beverage cap production requires very fast cycle times and exceptional machine dynamics.

Concentrated Productivity

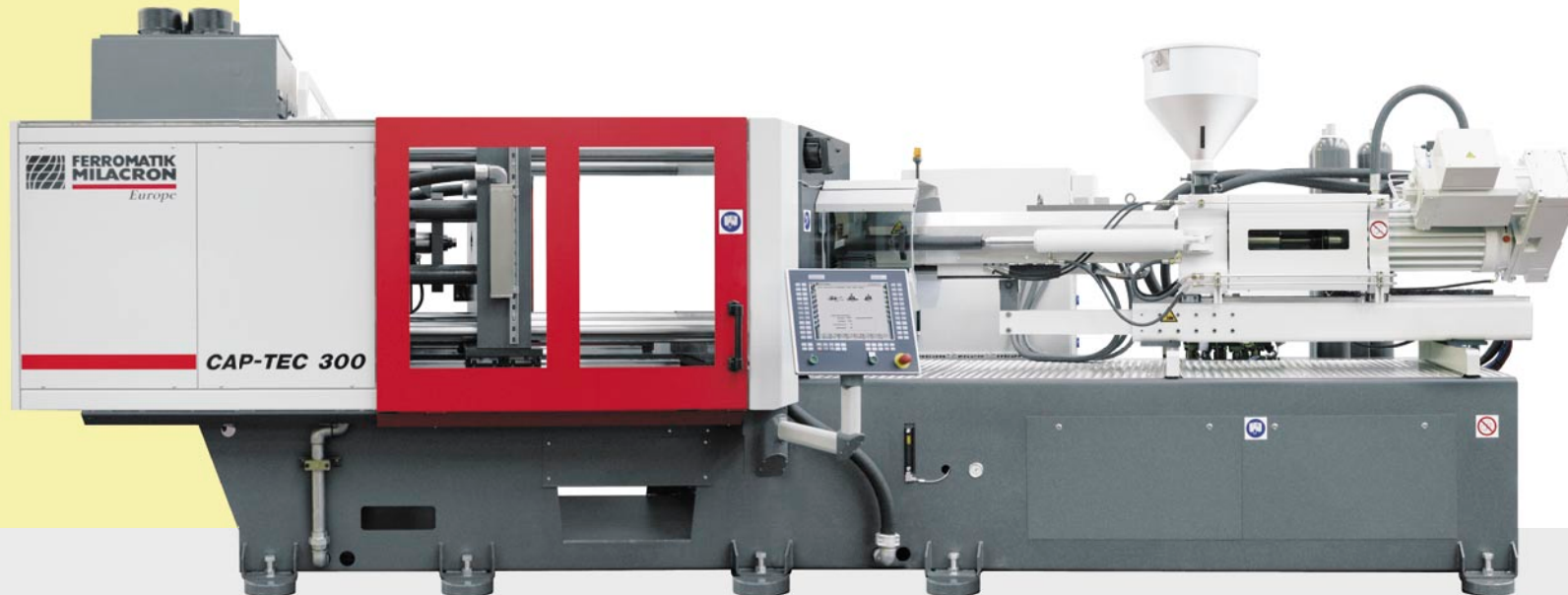
The design of the CAP-TEC builds on the foundations of the proven K-TEC series. Since both the mold and screw stroke are shorter than with standard applications, the CAP-TEC features a significantly shorter base. In order to provide the necessary dynamics, Ferromatik Milacron has enhanced frame rigidity without adding significantly to the overall weight of the machine. By making use of parallel machine movements, the CAP-TEC is able to reduce non-productive time in each cycle. Due to the short stroke of the clamping unit, the hydraulic accumulator is used for clamp force build-up – greatly reducing energy consumption.

Long Live the Mold!

The three-platen clamp features a reinforced construction designed to provide outstanding mold platen parallelism. This, combined with the centrally applied clamping force and industry-leading mold safety monitoring, ensures above-average mold longevity.

Best-in-Class Output

Thanks to ultra-short cycle times and high efficiency, the CAP-TEC offers the most economical solution for the production of beverage caps along with the lowest energy consumption rates.



THE K-TEC SERIES

Versatile Platform for Closures Production



Prepared for Multi-Component Solutions

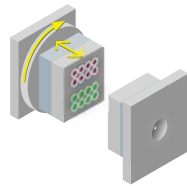
Closures are not just for opening and closing containers: they can provide many other functions as well. From appearance – for example to reinforce brand recognition – to convenience, such as dispensing, closures come in many shapes and sizes and may include one or more components. Ferromatik Milacron machines have been at work on the front lines with the leaders in the packaging industries for more than 35 years. Thus the K-TEC comes with a wealth of engineering experience in providing innovative production solutions. Through the use of additional injection units, K-TEC machines provide the basis for versatile solutions with multi-component technologies:

Core Pull

With this technology, the second material cavity is created by the movement of a slide or core. Commonly used for 2-component flip-top closures, this is the simplest solution for doubling productivity with stack-molds.

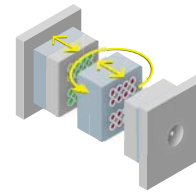
Turntable

A turning mechanism, electrically or hydraulically driven, with two or more stations rotates the mold between injection operations. The open or closed loop rotation is controlled by the machine. This solution is mainly used for smaller volume parts since the number of stations limits the available mold area.



Turning Stack Molds (180°)

For high output applications, a vertically stack-turning mechanism allows simultaneous injection on opposite sides of the stack. The closed loop turning mechanism is controlled by the machine and the complete molding area is available, almost doubling production in comparison with standard turntable solutions. Stack turning molds are used for 2-component closures where high output is required.



Parts Requirements

- Large multi-cavity caps molds
- 8, 16, 24, 32, 48-cavity molds
- Special HDPE grade or PP

Production Requirements

- Fast cycle time
- High shot-to-shot repeatability
- Versatile clamping area for specific mold systems





CUBE MOLDS

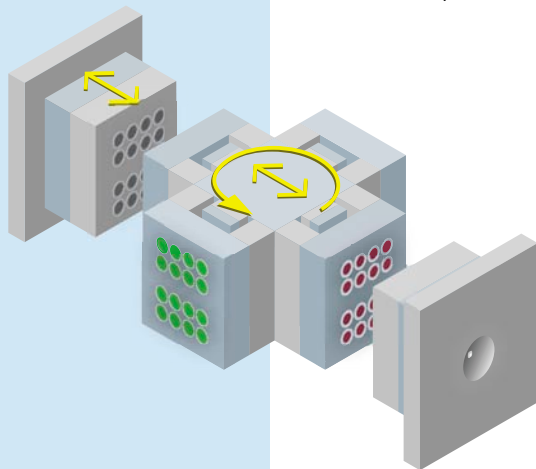
Advanced Production Solution for Closures

Additional Functions on Two Lateral Faces without Impact on Cycle Time

- Cooling
- In-Mold-Labeling
- Insert placement
- Part inspection
- Part removal

High Level of Mold Protection

- Two mold protection controls: one for the cube and one for the moving mold platen



The cube is an exclusive solution from Ferromatik Milacron and mold maker Foboha. It features an innovative mold design with four faces for multiple processes at the same time. This offers the injection molder a wealth of possible process combinations for creative closure designs and production solutions. While the first component is injected in the traditional position, the second position in the simplest case is used for cooling. Additional processes executed at this position lead to further reduction of cycle time.

Such processes are:

- Part inspection
- In-Mold-Labeling
- Insert placement

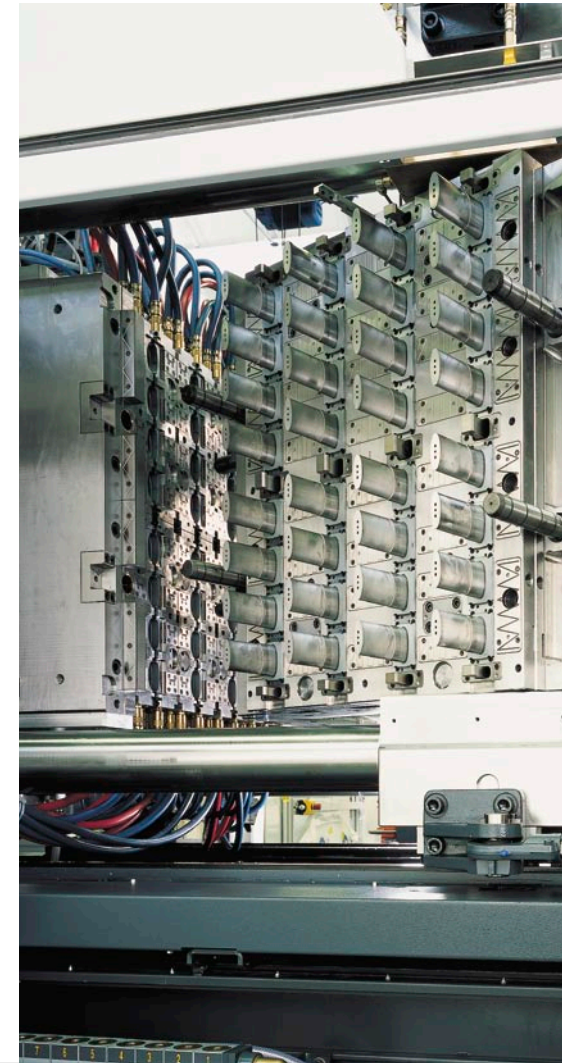
The third position opposite the main injection unit is the location for the additional injection unit. This is usually a traversing injection unit which offers:

- No additional floor space required
- Continuous nozzle contact with hot runner manifold

The fourth position is also used for cooling and integrated processes without impact on cycle time:

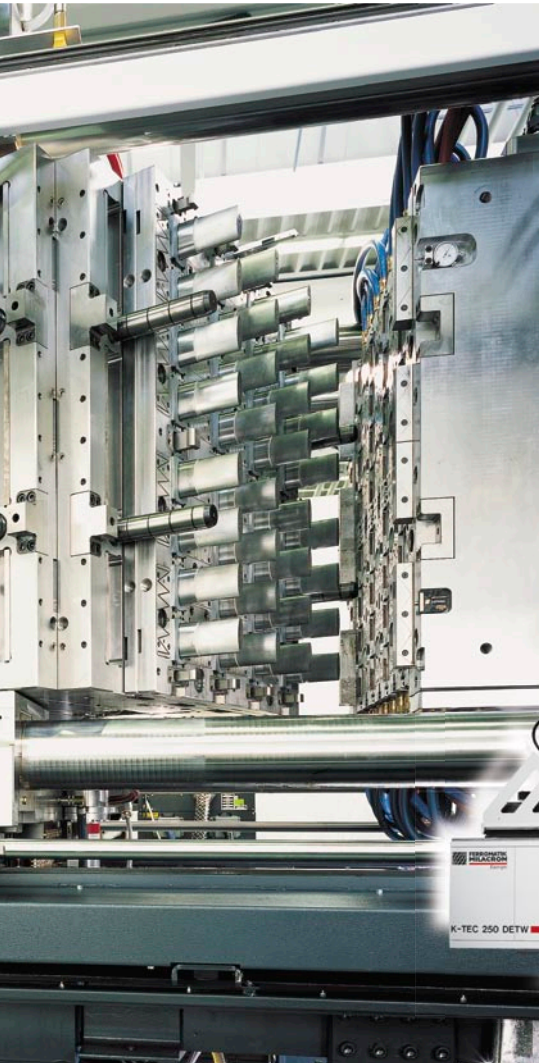
- Part inspection
- Part removal by drop-off
- Part take-out

With four available positions a variety of different processes can be integrated into the injection molding machine – these can be for more than two components.

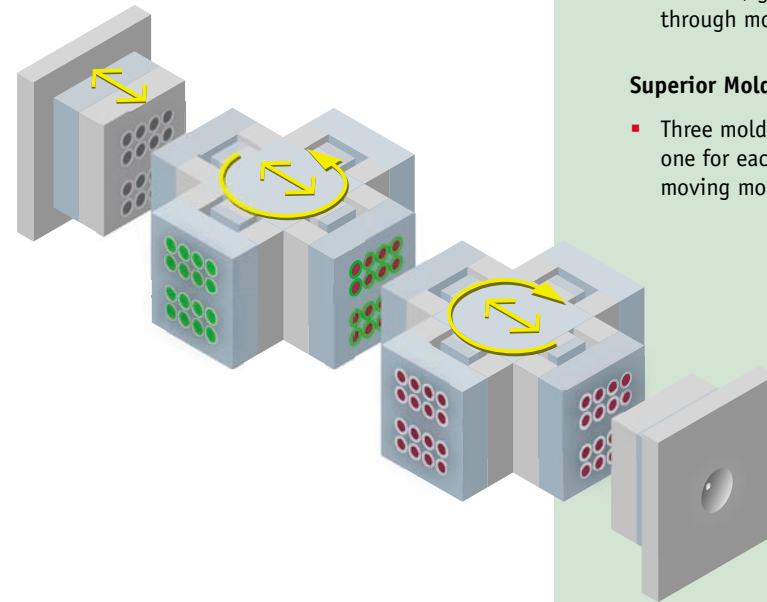


TWIN CUBE MOLDS

Multi-Element Molding with In-Mold-Assembly



The twin cube is an exclusive solution from Ferromatik Milacron and mold maker Foboha. It offers all the advantages of cube molds with the added option of in-mold assembly. The result is an injection molding system capable of producing finished multi-element closure systems. This unique approach allows a single machine to replace two injection molding machines and a complex assembly line. Not only does this greatly reduce the floor space which would otherwise be required, but – with parts properly oriented in their respective mold cavities – smooth assembly is assured. This solution also eliminates the risk of damaging parts during intermediate storage or during positioning for assembly. For injection molders, twin cube technology offers a production system and the guarantee of high efficiency and maximum up-time.



Additional Functions on Four Lateral Faces without Impact on Cycle Time

- Cooling
- In-Mold-Labeling
- Insert placement
- Part inspection
- Part removal

Assembly in the Middle Station

- Precision positioning of the components
- Accurate, gentle assembly through mold actuators

Superior Mold Protection

- Three mold protection controls: one for each cube and one for the moving mold platen

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